REMARKS

The Office Action dated February 5, 2008 has been carefully reviewed. Claims 67-74 are pending. Claims 67, 70-71 and 74 have been rejected under 35 U.S.C. § 103(a), as being unpatentable by Yahya (U.S. Patent No. 5,217,626) in view of Kosti (U.S. Patent No. 4,229,410) and further in view of Choi (Bulletin of the Korean Fisheries Society). Claims 68 and 72 are rejected under 35 U.S.C. §103(a), as being unpatentable over Yahya (U.S. Patent No. 5,217,626) in view of Choi (Bulletin of the Korean Fisheries Society) as further exemplified by Perrier et al. (U.S. Patent No. 6,132,750). Claims 69 and 73 are rejected under 35 U.S.C. §103(a) as being unpatentable over Yahya et al (U.S. Patent No. 5,217,626) in view of Kosti (U.S. Patent No. 4,229,410).

A Declaration of Bradley J. Eldred Pursuant to 37 C.F.R. § 1.132 is submitted herewith containing data relevant to the non-obviousness of the rejected claims.

Reconsideration of the grounds of rejection is respectfully requested in view of the remarks herein and the accompanying Declaration of Bradley J. Eldred Pursuant to 37 C.F.R. § 1.132.

Applicant respectfully asserts that the claimed invention is not obvious in view of the cited references. Specifically, Yahya teaches away from the use of any concentration of silver and copper in a disinfectant solution in the absence of potassium permanganate. Applicant asserts that the suggested combination of Yahya and Kosti does not arrive at the claimed invention. Further, applicant includes data to show that the combination of the components produce unexpected and synergistic disinfections results. Accordingly, applicant requests reconsideration and allowance of claims 67-74.

Summary of Examiner Interview

The applicant notes with appreciation the Examiner Interview of May 29, 2008, during which Arguments I, II, and III presented herein and the data presented in the Declaration of Bradley J. Eldred were discussed with the Examiner. During the Interview, Examiner Chorbaji agreed to consider the arguments and data, and advised on how the material should be presented. Further to the Examiner's

favorable response and advice during the Interview and his agreement to consider the Arguments and data, applicant respectfully requests allowance of claims 67-74.

Response to Office Action

I. Yahya Teaches Away From Using Copper and Silver Ions as a Disinfectant in the Absence of Potassium Permanganate.

In Yahya, Figure 1 clearly demonstrates that the combination of silver and copper at the claimed concentrations is ineffective by itself as a disinfectant of viruses. As shown by the figure, the desired antibacterial and antifungal properties only result when the silver and copper are combined with potassium permanganate, which is itself a known disinfectant. Thus, one of skill in the art understands that the only real value is in the combination of these three components. Since the combination of silver and copper only display disinfectant properties when combined with potassium permanganate, it is clear that potassium permanganate alters the material qualities of the combination of silver and copper, *i.e.*, the composition's disinfectant qualities. Therefore, because the use of the transitional phrase "consisting essentially of" excludes the presence of other components which alter the basic and novel material qualities of the subject matter, the use the transitional phrase in the pending claims excludes the presence of potassium permanganate. To use the combination of silver and copper alone as a disinfectant would destroy the intent of the composition of Yahya, which focuses on the greater than additive effect of combining the silver and copper with the potassium permanganate. Thus, Yahya teaches away from the use of any concentrations of silver and copper in combination with any other constituent in a disinfectant solution in the absence of potassium permanganate. None of the other cited references can cure this deficiency. Accordingly, applicant requests that the rejections based on Yahya be withdrawn.

II. Even If Combined, Kosti and Yahya Fail to Arrive at Claimed Invention.

The claimed composition relates to several components which are each dissolved in a fluid. The Office Action cites Kosti in combination with Yahya to demonstrate that the use of glycerin within the claimed composition would have been obvious to one skilled in the art.

However, Kosti relates to a solid tablet which is only briefly contacted with water, such as during a toilet flush. Col. 2, lines 3-6. The Kosti tablet is designed to resist dissolution during this brief contact with water, in order to last for the intended 10-1000 flushes. Col. 3, lines 25-28. The Kosti tablet is not meant to be fully dissolved in water, and in fact doing so would destroy the intended function of the Kosti tablet. Therefore, rather than suggesting the use of glycerin or grapefruit seed extract within the claimed fluid composition as suggested by the Office, Kosti teaches away from completely dissolving the components in a fluid. In the present case, the Office has not provided any rationale for how the combination of references can arrive at the claimed invention, much less how the combination arrives at the claimed concentration ranges.

Additionally, the applicant respectfully asserts that reliance upon Kosti as a reference to suggest the use of glycerin as a disinfectant in the claimed composition is inappropriate because glycerin is commonly used in culture media as well as for long-term storage of microbes of various types. In other words, glycerin is used to enhance the growth, recovery, and long-term storage of microbes, particularly bacteria. *See* Holt et al., Bergey's Manual of Derterminative Bacteriology, 9th ed., pp. 209-222, Williams & Wilkins; Aulet de Saab et al., *A Comparative Study of Preservation and Storage of Haemophilus influenzae*, SciElo, Vol. *96*(4): 583-586, May 2001; World Health Organization, *Blood Safety and Clinical Technology, Guidelines on Standard Operating Procedures for Microbiology, Chapter 5: Bacteriological Media,* http://www.searo.who.int/EN/Section10/Section17/Section53/Section482_1782.htm; Jamasbi et al., *Influence of bacteriological media constituents on the reproduction of Salmonella enteritidis bacteriophages*, Antonie van Leeuwenhoek, Volume 44, Number 1 / March, 1978, pp. 49-57; and Bio101, *Media Additives and Ingredients*, http://www.bio101.com/bacteria/media.html. Neither Choi or Perrier cure these deficiencies of the primary references relied upon, and therefore the claims are in a condition for allowance.

Additionally, the data in Declaration Exhibit B shows that the addition of glycerin to copper and silver ions actually decreased the disinfection efficacy at 60 minutes for viruses in River Water. *See* Declaration of Bradley J. Eldred ¶16, Exhibit B. Similarly, the data in Exhibit A shows that the addition of glycerin to copper and silver ions decreased the disinfection efficacy at 30 minutes for bacteria in Municipal Water. *See* Declaration of Bradley J. Eldred ¶16, Exhibit A. As a result, one of ordinary skill in the art would not expect the inclusion of glycerin with the other components in the claimed composition to increase disinfection of bacteria and viruses. Such unexpected results further support the nonobviousness of the claimed composition. *See In re Corkhill*, 711 F.2d 1496 (Fed. Cir. 1985) (a claimed composition showing an additive result when a diminished result would have been expected is persuasive of nonobviousness).

III. The Combination of the Components of the Claimed Composition Produce Unexpected and Synergistic Results

The pending claims relate to a disinfection and purification composition consisting essentially of copper, silver, grapefruit seed extract, and glycerin. The Examiner asserts that the claimed composition is obvious in view of Yahya, Choi, Perrier, and Kosti. While the Examiner acknowledges that none of the references disclose the claimed combination, the Examiner contends that it would be obvious to one skilled in the art to combine the components disclosed in each of the references to create the claimed compositions. As explained below and in the Declaration, the combination of these components in the present inventive composition produces a synergistic disinfectant effect far greater than the expected additive effect, and far greater than the effect which would have been expected from the cited references, and therefore the claimed composition is not obvious in view of the cited references.

The accompanying Declaration includes bacteria and virus disinfection data by the claimed composition, the individual components of the composition, and several other combinations of the components in water at various contact times. *See* Declaration of Bradley J. Eldred, Exhibits A and B.

The Declaration and data presented in Exhibits A and B clearly demonstrate that the claimed composition provides a synergistic disinfectant effect. This synergistic effect results in a markedly higher disinfection efficacy (i.e. completeness of kill or inactivation) on bacteria and viruses in both municipal water and river water matrices. This synergistic effect also results in a faster reduction in bacteria and / or viruses in both municipal water and river water matrices (i.e. kill or inactivation is achieved with a shorter contact time).

As the Office is aware, synergism is demonstrated when the disinfectant efficacy of the claimed combination is greater than the sum of the disinfectant effect of the individual components of the claimed combination. *See* MPEP § 716.02(a). With respect to the claimed composition, synergism is demonstrated not only in overall disinfection efficacy (i.e. completeness of kill) but also in the speed of the disinfection reaction.

Efficacy of Disinfection:

The data in Declaration Exhibits A and B show that in both municipal and river water, the claimed composition is at least 275 and up to about 27,000,000 times more effective in reducing viruses in a water sample after 60 minutes of contact time than any of the other tested components. *See* Declaration ¶¶ 7, 10, Exhibits A and B. In fact, none of the tested components or combinations, other than the claimed composition, were effective in disinfecting viruses in either water matrix – they demonstrated log reduction in viruses of less than 2 (i.e. <99%) after 60 minutes while the claimed composition demonstrated reductions of more than 4 logs (>99.99%) and more than 7 logs (>99.9999%) in river water and municipal water matrices, respectively. *See* Declaration Exhibits A and B. Similarly, the data in Declarations A and B show that a synergistic effect also occurs on bacterial disinfection efficacy in both municipal water and river water matrices with the increased efficacy ranging up to more than 45,000 times individual components or combinations of components.

Rate of Disinfection:

With respect to bacteria, the synergistic disinfection effect of the claimed composition results in a faster, more effective disinfectant composition. The data in Declaration Exhibit A shows that the claimed composition is more efficient at killing bacteria in water samples more rapidly than any of the individual components or other combinations thereof. *See* Declaration ¶8, Exhibit A. As shown in Declaration Exhibit A, the claimed composition reaches its full disinfection potential by 30 minutes of contact time, while the remaining tested components and combinations take at least 60 minutes to reach their bacteria disinfection potential (which potential is notably still not as high as the disinfection effect of the Claimed Composition even after extended contact times). *See* Declaration ¶8, Exhibit A. This is also an unexpected result supporting nonobviousness, as the test results and cited references do not suggest that the claimed combination would result in faster bacterial disinfection.

Therefore, the disinfection results of the claimed composition are clearly greater than the sum of the disinfection results of each of the components taken separately, and thus demonstrate synergism. *See* Declaration ¶¶ 7, 10, Exhibits A and B; *Merck & Co., Inc. v. Biocraft Laboratories, Inc.*, 874 F.2d 804 (Fed. Cir.), *cert. denied*, 493 U.S. 975 (1989). The greater than expected virus disinfection results strongly support the nonobviousness of the claimed composition.

CONCLUSION

In view of the foregoing remarks and the submitted Declaration, it is submitted that pending claims 67-74 are in condition for allowance. Accordingly, reconsideration and allowance of claims 67-74 are requested.

Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 presented in the Office Action mailed February 5, 2008.

The Commissioner is hereby authorized by this paper to charge any fees due in connection with the filing of the response to Deposit Account No. **50-0310**.

Respectfully submitted,

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Date

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